

What is claimed is:

1 1. A catheter system comprising:
2 a deflection region having a longitudinal axis and a length, the deflection
3 region having a wall, the wall having at least two sections, each section having a
4 specific density which is different from each other section, the wall sections
5 configured to define a predefined deflection pattern when a force is applied to the
6 deflection region.

1 2. The catheter system of claim 1, further comprising:
2 at least one longitudinal element provided within the wall of the
3 deflection region, the longitudinal element being substantially axially aligned with the
4 longitudinal axis of the deflection region and providing a directional bias to the
5 deflection region.

1 3. The catheter system of claim 2, wherein the longitudinal element is
2 made from a shape memory material.

1 4. The catheter system of claim 2, wherein the longitudinal element is a
2 wire.

1 5. The catheter system of claim 2, wherein the longitudinal element is a flat
2 shim.

1 6. The catheter system of claim 1, further comprising an actuator member
2 provided to apply an actuation force to the deflection region.

1 7. The catheter system of claim 1, further comprising a rib along the wall.

1 8. The catheter system of claim 7, wherein the longitudinal member is
2 provided within the rib.

1 9. The catheter system of claim 1, further comprising a body region having
2 a body wall, the body region being attached to the deflection region.

1 10. The catheter system of claim 9, wherein the body wall defines a lumen
2 and a conduit is provided within the lumen.

1 11. The catheter system of claim 10, wherein the conduit is located in the
2 center of the lumen.

1 12. The catheter system of claim 11, further comprising a torqueable
2 member provided within the lumen.

1 13. The catheter system of claim 12, wherein the torqueable member is
2 located adjacent the conduit.

1 14. The catheter system of claim 12, wherein the torqueable member is
2 located adjacent the body wall.

1 15. The catheter system of claim 10, further comprising a plurality of vanes
2 adjacent the torqueable member.

1 16. The catheter system of claim 1, further comprising a distal region.

1 17. The catheter system of claim 16, wherein the distal region includes a
2 treatment tip.

1 18. The catheter system of claim 1, further comprising a non-compressible
2 element.

1 19. The catheter system of claim 9, further comprising a non-compressible
2 element.

1 20. The catheter system of claim 18, wherein the non-compressible element
2 is provided adjacent the wall.

1 21. The catheter system of claim 18, wherein the non-compressible element
2 is provided within the wall.

1 22. The catheter system of claim 19, wherein the non-compressible element
2 is provided adjacent the body wall.

1 23. The catheter system of claim 19, wherein the non-compressible element
2 is provided within the body wall.

1 24. The catheter system of claim 19, wherein the non-compressible element
2 is provided adjacent the wall and the body wall.

1 25. The catheter system of claim 19, wherein the non-compressible element
2 is provided within the wall and the body wall.

1 26. The catheter system of claim 18, wherein the non-compressible element
2 is a braided sleeve.

1 27. The catheter system of claim 18, wherein the non-compressible element
2 is a coil.

1 28. A catheter system comprising:
2 a deflection region having a longitudinal axis and a length, the deflection
3 region having a wall, the wall having at least two sections, each section having a
4 specific density which is different from each other section,
5 at least one longitudinal element disposed within the wall of the
6 deflection region, the longitudinal element being substantially axially aligned with the
7 longitudinal axis of the deflection region and providing a directional bias to the
8 deflection region, the different wall sections and the longitudinal element being
9 configured to define a predefined deflection pattern when a force is applied to the
10 deflection region.

1 29. A catheter system comprising:
2 at least two longitudinal elements disposed within a wall of a deflection
3 region, the wall having a longitudinal axis and the longitudinal elements being
4 substantially axially aligned with the longitudinal axis of the deflection region;
5 at least two actuator members, the actuator members being configured to
6 apply respective actuation forces to the deflection region, the deflection forces being
7 substantially aligned with the longitudinal axis of the deflection region;
8 wherein the longitudinal members and the actuation members are
9 arranged radially around the wall of the deflection region relative to one another in a
10 configuration to define a deflection plane and shape of the deflection region.

1 30. The catheter system of claim 29, wherein the longitudinal members and
2 the actuation members are aligned at ninety degree increments around the wall of the
3 deflection region.

1 31. A catheter system comprising:
2 a body region having a body wall, the body region defining a lumen;
3 a conduit disposed within the lumen; and
4 a torqueable member provided within the lumen, the torqueable member
5 being configured to transmit rotational forces along the catheter system.

1 32. The catheter system of claim 31, wherein the torqueable member is
2 provided adjacent the conduit.

1 33. The catheter system of claim 31, wherein the lumen has an outer
2 periphery and the torqueable member is provided adjacent the periphery of the lumen.

1 34. The catheter system of claim 31, further comprising a plurality of vanes
2 adjacent the torqueable member and the conduit, the vanes being configured to support
3 the conduit within the catheter system.

1 35. The catheter system of claim 31, wherein the torqueable member is a
2 braided sleeve.

1 36. The catheter system of claim 31, wherein the torqueable member is a
2 coil.

1 37. The catheter system of claim 31, further comprising a non-compressible
2 element

1 38. The catheter system of claim 37, wherein the non-compressible element
2 is provided adjacent the wall.

1 39. The catheter system of claim 37, wherein the non-compressible element
2 is provided within the wall.

1 40. The catheter system of claim 37, wherein the non-compressible element
2 is a braided sleeve.

1 41. The catheter system of claim 37, wherein the non-compressible element
2 is a coil.

1 42. The catheter system of claim 31, further comprising a distal region
2 attached to the deflection region, the distal region including a treatment tip and being
3 configured to affect a tissue to be treated.

1 43. A method of forming a catheter system, comprising the steps of:
2 providing at least one longitudinal member;
3 forming a body with a predefined density around the longitudinal
4 element.

1 44. A catheter system comprising:
2 a deflection region having a longitudinal axis and a length, the deflection
3 region having a wall, the wall having at least two sections, each section having a
4 specific density which is different from each other section, the different wall sections
5 being configured to define a predefined deflection pattern when a force is applied to
6 the deflection region;
7 at least one longitudinal element disposed within the wall of the
8 deflection region, the longitudinal element being substantially axially aligned with the
9 longitudinal axis of the deflection region and providing a directional bias to the
10 deflection region;
11 an actuator member, the actuator member being configured to apply the
12 force;
13 a body region having a body wall, the body region being attached to the
14 deflection region and the body wall defining a lumen having a conduit disposed
15 therein;
16 a torqueable member provided within the lumen, the torqueable member
17 being located adjacent the conduit and configured to transmit rotational forces along
18 the catheter system;
19 a plurality of vanes adjacent the torqueable member, the vanes being
20 configured to support the conduit within the catheter system;
21 a distal region attached to the deflection region, the distal region
22 including a treatment tip and being configured to affect a tissue to be treated.